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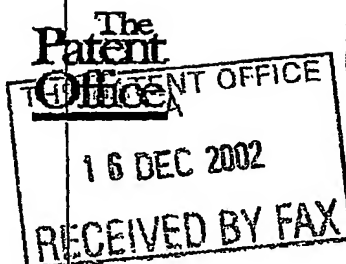
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Dated 8 January 2004

**PRIORITY  
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Patent Form 1/77

Patent 1977  
(made 18)

DOZ 9-13  
16DEC02 E770977-1-002977  
P01/7700 D:00-0229141.7

**Request for grant of a patent**

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form.)

The Patent Office

Cardiff Road  
Newport  
South Wales  
NP9 1RH

1. Your reference

OTV/P401567GB- P10700 6300

2. Patent application number  
(The Patent Office will fill in this part)

0229141.7

16 DEC 2002

3. Full name, address and postcode of the or of each applicant (underline all surnames)

Splashpower Limited  
St. John's Innovation Centre  
Cowley Road  
Cambridge  
CB4 0WS

Patents ADP number (if you know it)

8822310001

If the applicant is a corporate body, give the country/state of its incorporation

UK

4. Title of the invention

Improvements relating to contact-less power transfer

5. Name of your agent (if you have one)

Harrison Goddard-Foot

"Address for service" in the United Kingdom  
to which all correspondence should be sent  
(including the postcode)

Belgrave Hall  
Belgrave Street  
Leeds  
LS2 8DD

FS1/77  
12.11.02

HAJELTINE CAKE  
IMPERIAL HOUSE  
15-19 KROSNAT  
LONDON  
WCB 6UR

Patents ADP number (if you know it)

14571001 7631310002 36001

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number  
(if you know it)Date of filing  
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing  
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if)

- a) any applicant named in part 3 is not an inventor, or  
b) there is an inventor who is not named as an applicant, or  
c) any named applicant is a corporate body.  
(See note (d))

Yes

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## Patents Form 1/77

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|                                  |   |
|----------------------------------|---|
| Continuation sheets of this form | 0 |
| Description                      | 5 |
| Claim(s)                         | 0 |
| Abstract                         | 1 |
| Drawing(s)                       | 2 |

10. If you are also filing any of the following, state how many against each item.

## Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for preliminary examination and search (Patents Form 9/77)

Request for substantive examination (Patents Form 10/77)

Any other documents  
(please specify)

1

Cover letter

11.

I/We request the grant of a patent on the basis of this application.

Signature

Date

16/12/2002

12. Name and daytime telephone number of person to contact in the United Kingdom

Chris Vaughan

0113 233 0100

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## Notes

- If you need help to fill in this form or you have any questions, please contact the Patent Office on 0645 500505.
- Write your answers in capital letters using black ink or you may type them.
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Patents Form 1/77

**IMPROVEMENTS RELATING TO ENABLING CONTACT-LESS POWER**  
**TRANSFER**

This invention relates to a new device and method for transferring power in a  
5 contact-less fashion.

Many of today's portable devices contain an internal secondary cell or battery which  
may be recharged by temporarily attaching an external adaptor to the power  
connector of the device. However this is something of a nuisance for users because it  
10 requires manual dexterity, requires both hands, and, especially, because different  
manufacturers use incompatible connectors, so the right adaptor must be located for  
each device.

Various means have been proposed for charging devices without the need to attach  
15 an external adaptor. These include:

- A surface providing power by presenting an array of contacts which then  
mate with receiving contacts on the device. Examples include:
  - In academia, the "Networked Surfaces" research conducted by James  
Scott and Frank Hoffman of the Laboratory for Communications  
20 Engineering, Engineering Department, University Of Cambridge,  
U.K.
  - In business, the wire-free electricity base proposed by MobileWise  
Inc., U.S.A.
- A surface providing power to devices by induction, without any contacts, for  
25 example as disclosed in UK patent application numbers 0228425.5. In this  
system, the device incorporates a substantially flat means of receiving power  
inductively, conditioning it and then providing it to the device's battery and  
electronics.

30 These solutions typically require a device design to be modified, typically by the  
Original Equipment Manufacturer, in order to incorporate the power-receiving means  
during manufacture. However there is a very large installed base of mobile devices

which are not already enabled. It would therefore be convenient to have a solution whereby the user could enable an existing device by simply retrofitting a power-receiving means to it.

5 According to a first aspect of the present invention, there is provided an attachable means for receiving power, the means comprising:

- i) a substantially flat power-receiving means of sufficiently small dimensions that it can attach to an existing portable device without significantly altering its ergonomics;
- 10 ii) a power connector capable of attaching to the power input of an existing portable device; and
- iii) a means of attaching part or all of the above to a portable device.

The benefit of the invention is that it enables users to add wireless power transfer  
15 capability to their existing portable devices easily.

According to a second aspect of the present invention, there is provided a portable electronic device fitted with a power-receiving means of the first aspect of the  
20 present invention.

20

In use, the user simply attaches the power-receiving means onto the portable device and then connects the power connector to the power-input of the portable device, thus enabling the device to receive power without wires from an external charger adapted to transmit power in a wireless manner to a power-receiving means, for  
25 example by way of electromagnetic induction.

The attachment means might be an adhesive, or might be some mechanical means such as a clip. It may be removable or permanent once applied.

30 Optionally, the power-connector may be attached to the power-receiving means by a flexible attachment, allowing the power-connector to be inserted and removed from

the device's power-input while the power-receiving means remains attached for convenient future use.

5      Optionally, the power-connector may itself incorporate a contact means similar to the power-receiving means of the device, so that even when it is connected to the device, the device may still be plugged in to a conventional adaptor in a "pass-through" fashion.

10     If the power received by the power-receiving means must be power-conditioned before being passed to the device, the power-conditioning circuitry may optionally be incorporated into the power-receiving means or the power-connector.

15     Optionally, all parts of the invention, especially the adhesive, may be substantially waterproof.

20     Optionally, the power-receiving means may be coloured and textured such that, when adhered to the device, it appears to be a part of the device. Alternatively, or additionally, the power-receiving means may carry text or pictures, for example a logo or advertising.

25     Optionally, the power-receiving means may include a substantially transparent pocket into which pictures and the like may be slid.

30     Optionally, a power indicator may be provided, optionally in the power-receiving means or the power-connector, to indicate when power is being received and/or being passed to the device. The indicator may produce light (perhaps an LED or electroluminescent panel), sound or vibration.

35     Optionally, if the power-receiving means is of a type which does not require contact with the power-supplying surface (for example, if it works by induction), then it may be applied inside the device instead of outside, for example to the rear of the battery compartment.

Optionally, the power-connector may connect to internal power contacts within the device, possibly to its batteries and/or battery contacts.

- 5 The following non-exhaustive list illustrates some examples of devices that can be enabled using the present invention. Possibilities are not limited to those described below:
- A mobile communication device, for example a radio, mobile telephone or walkie-talkie;
  - 10 • A portable computing device, for example a personal digital assistant or palmtop or laptop computer;
  - Portable entertainment devices, for example a music player, game console or toy;
  - Personal care items, for example a toothbrush, shaver, hair curler, hair rollers;
  - 15 • A portable imaging device, for example video recorder or camera;
  - Containers of contents that may require heating, for example coffee mugs, plates, cooking pots, nail-polish and cosmetic containers;
  - Consumer devices, for example torches, clocks and fans;
  - A battery-pack for insertion into any of the above;
  - 20 • A standard-sized battery cell;

In the case of unintelligent secondary devices such as a battery cell, some sophisticated charge-control means may also be necessary to meter inductive power to the cell and to deal with situations where multiple cells in a device have different charge states. Furthermore, it becomes more important for the primary unit to be able to indicate a "charged" condition, since the secondary cell or battery may not be easily visible when located inside another electrical device.

25

For a better understanding of the present invention and to show how it may be carried into effect, reference shall now be made, by way of example only, to the accompanying drawings, in which:

30

FIGURE 1 shows the various parts of one possible instantiation of the present invention, and an example mobile device to which they attach.

5 Figure 1a shows a side view of an existing portable device 100 with its power-connector 101 which in this case is a socket. Above the device is shown the present invention, consisting of:

- 200 A substantially flat power-receiving means
- 201 A layer of adhesive
- 202 Flexible wiring
- 10 203 A power-connector capable of being plugged-in to the device's power-connector 101.

Figure 1b shows an end view of the arrangement.

15 Figure 1c shows a side view of the arrangement.

Figure 2 shows similar views of a different variant of the present invention. In this case the device power connections 101 are contact strips instead of a socket. The power connector of the present invention has corresponding mating strips 204 upon it  
20 which make electrical contact with the device's power connections. In addition, pass-through connectors 205 are provided so that other equipment, for example an in-car hands-free unit or charger, may still be connected. These are connected electrically to the corresponding contacts 204.

25 The preferred features of the invention are applicable to all aspects of the invention and may be used in any possible combination.

Throughout the description and claims of this specification, the words "comprise" and "contain" and variations of the words, for example "comprising" and  
30 "comprises", mean "including but not limited to", and are not intended to (and do not) exclude other components, integers, moieties, additives or steps.



**ABSTRACT****IMPROVEMENTS RELATING TO CONTACTLESS POWER TRANSFER**

5

There is disclosed a system for converting existing portable electric and electronic devices to enable them to receive power from an adaptor or charger in a wireless manner. In particular, there is disclosed a wireless power-receiving means adapted to be retrofitted to an existing portable electric/electronic device in a simple manner.

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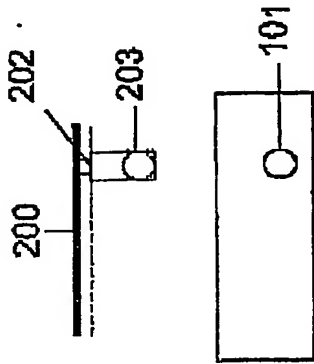


Figure 1a

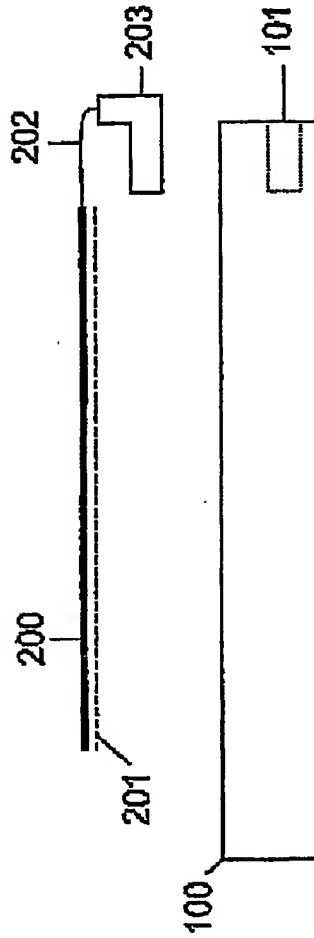


Figure 1b

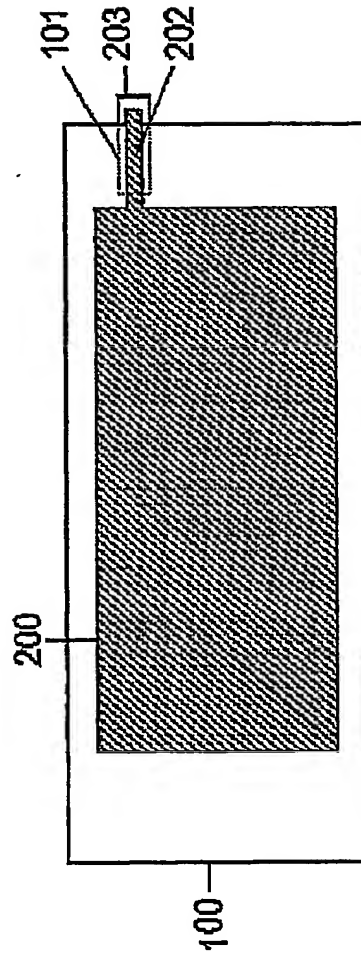


Figure 1c

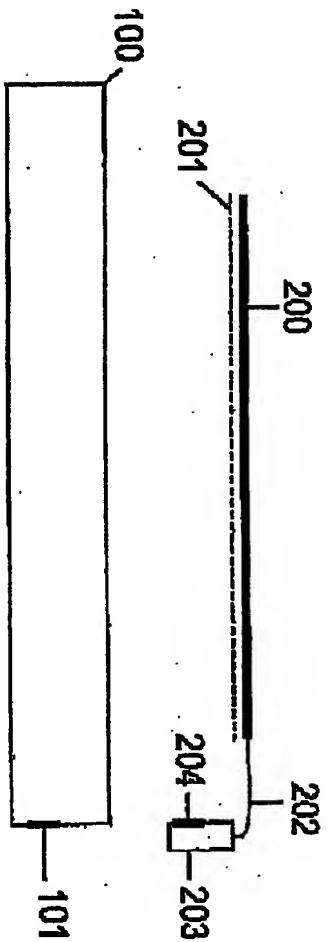


Figure 2a

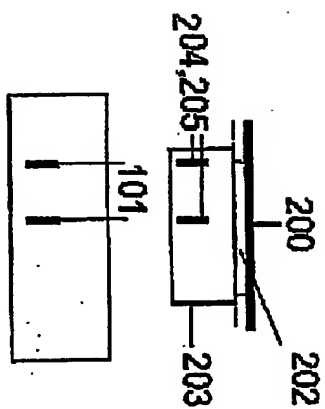


Figure 2b

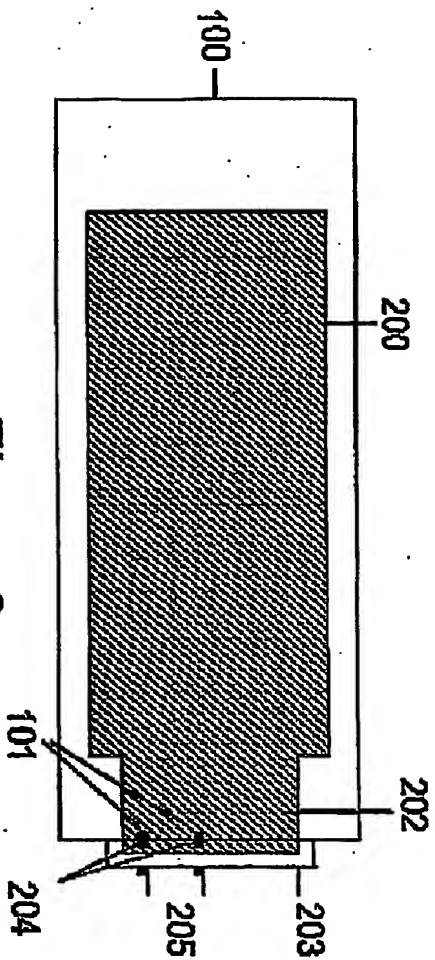


Figure 2c

2/2